WHAT IS CLAIMED IS:

1. An induction heating system comprising:

a power switch;

a resonant heating circuit configured to be coupled to a load and configured to generate an oscillating voltage in response to a DC voltage pulse; and

a pulse initiator configured to provide a monitoring voltage having a value representative of an average value of a peak voltage of the oscillating voltage generated by the resonant heating circuit and to provide a pulse initiation signal to initiate application of a subsequent DC voltage pulse to the resonant circuit when the value of the monitoring voltage is substantially equal to or less than a predetermined threshold value.

2. The induction heating system of claim 1, wherein the power switch is configured to close and open to provide the DC voltage pulses.

3. The induction heating system of claim 2, wherein the power switch is configured to open and close in response to a switch control signal.

4. The induction heating system of claim 3, further comprising:

a pulse controller positioned between the pulse initiator and the power switch and configured to provide the switch control signal to the power switch, wherein response to the pulse initiator detecting that the average power across the resonant is at a level substantially equal to a predetermined minimum threshold value the pulse controller provides a switch control signal that causes the power switch to close.

5. The induction heating system of claim 4, wherein after causing the power switch to close the pulse controller is configured to provide, after a time duration, a switch control signal that causes the power switch to open.

6. The induction heating system of claim 5, wherein the time duration is a predetermined fixed value substantially equal to a maximum allowable duration based upon a maximum storage capacity of the resonant heating circuit.

7. The induction heating system of claim 5, wherein the time duration is a adjustable between a minimum value and a maximum value wherein the maximum value is duration based upon a maximum storage capacity of the resonant heating circuit.

8. The induction heating system of claim 1, wherein the pulse initiator comprises:

a voltage sampling circuit configured to provide a monitoring voltage representative of an average peak-to-peak voltage of the oscillating voltage of the resonant circuit; and

level determinator configured to receive the monitoring voltage and configured to initiate application of the subsequent DC voltage pulse when a level of the average peak-to-peak voltage of the oscillating voltage is substantially equal to the predetermined minimum threshold value.

9. The induction heating system of claim 8, wherein the level determinator comprises a comparator circuit.

10. The induction heating system of claim 8, wherein the voltage sampling circuit comprises:

a full-wave rectifier having a pair of input nodes respectively coupled across the resonant circuit by a first and second capacitor and having a first output node coupled to ground and a second output node;

a smoothing capacitor coupled across the full-wave rectifier output nodes; and

a resistor coupled in parallel with the smoothing capacitor, wherein a voltage across the resistor is the monitoring voltage.

11. The induction heating system of claim 9, wherein the comparator comprises:

an operational amplifier having a non-inverting input coupled to the resistor, an inverting signal configured to receive the predetermined minimum

threshold value, and an output configured to initiate application of the subsequent DC voltage pulse when a level of the average peak-to-peak voltage of the oscillating voltage is substantially equal to the predetermined minimum threshold value.

12. The induction heating system of claim 1, wherein the power switch comprises:
an insulated gate bipolar transistor (IGBT) having a gate configured to receive the control signal, a collector coupled to the power switch, and an emitter coupled to ground.

13. A method of operating an inductive heating system, the method comprising:
operating a power switch to apply a DC voltage pulse to a resonant circuit;
generating with the resonant circuit an oscillating voltage in response to the DC voltage pulse; and
applying a subsequent DC voltage pulse to the resonant circuit upon detecting that the average peak-to-peak voltage of the oscillating voltage across the resonant circuit is at a level substantially equal to a predetermined minimum threshold value.

14. The method of claim 13, wherein operating the switch comprises:
closing and opening the power switch.

15. The method of claim 13, wherein detecting the average peak-to-peak voltage of the oscillating voltage comprises:
providing a monitoring voltage representative of the average peak-to-peak voltage of the oscillating voltage across the resonant heating circuit;
comparing the monitoring voltage to a minimum threshold value; and
closing the power switch when the monitoring voltage is substantially equal to the minimum threshold value to thereby initiate application of a subsequent DC voltage pulse to the resonant heating circuit.

16. An induction heating system connectable to an AC source, the system comprising:

a rectifier connectable to an AC source and configured to provide a DC voltage at a DC output node;

a power switch having a first terminal, a second terminal coupled to ground, and a control gate;

a resonant circuit coupled between the DC output node and the first terminal of the power switch;

a pulse controller configured to provide a control signal to the power switch control gate to open and close the power switch to thereby provide a DC voltage pulse to the resonant circuit causing the resonant circuit to generate an oscillating voltage; and

a pulse initiator coupled in parallel with the resonant circuit and configured to monitor an average voltage across the resonant circuit and to provide a control signal to the pulse controller instructing the pulse controller to close the power switch to thereby initiate application of a subsequent DC voltage pulse to the resonant circuit when the average power across the resonant circuit falls to a level substantially equal to a predetermined threshold value.

17. The induction heating system of claim 16, wherein the power switch comprises:

an insulated gate bipolar transistor (IGBT) having a gate configured to receive the control signal, a collector coupled to the power switch, and an emitter coupled to ground.

18. The induction heating system of claim 16, wherein the pulse initiator comprises:

a voltage sampling circuit coupled in parallel with the resonant circuit and configured to provide a monitoring voltage representative of an average peak-to-peak voltage of the oscillating voltage of the resonant circuit; and

a comparator configured to receive the monitoring voltage and configured to provide the control signal to the pulse controller when a level of the average peak-to-peak voltage of the oscillating voltage is substantially equal to the predetermined threshold value.

19. The induction heating system of claim 18, wherein the voltage sampling circuit comprises:

a full-wave rectifier having a pair of input nodes respectively coupled across the resonant circuit by a first and second capacitor and having a first output node coupled to ground and a second output node;

a smoothing capacitor coupled across the full-wave rectifier output nodes; and

a resistor coupled in parallel with the smoothing capacitor, wherein a voltage across the resistor is the monitoring voltage.

20. The induction heating system of claim 18, wherein the comparator comprises:

an operational amplifier having a non-inverting input coupled to the resistor, an inverting signal configured to receive the predetermined threshold value, and an output configured to provide the control signal to the pulse controller.

21. The induction heating system of claim 16, wherein the resonant circuit comprises:

a capacitor having a first terminal coupled to the DC output node and a second terminal coupled to the second terminal of the power switch; and

an inductive heating coil coupled in parallel with the capacitor.

22. The induction heating system of claim 21, wherein the inductive heating coil is inductively coupled to a working head.